Ujjain Engineering College, Ujjain							
B.TECH I SEMESTER							W.e.f. July, 2018
COURSE CONTENTS							
MA 1301	**Mathematics-I**	**L**	**T**	**P**	**C**	**Max. Marks**	**Min. Marks**
Duration	3 Hours	3	1	0	4	70	22

Prerequisite: Higher secondary level mathematics.

Course Objective: The objective of this course is to familiarize the prospective engineers with techniques in calculus, multivariate analysis and linear algebra. It aims to equip the students with standard concepts and tools at an intermediate to advanced level that will serve them well towards tackling more advanced level of mathematics and applications that they would find useful in their disciplines.

UNIT 1: Calculus: (6 lectures, 2 tutorials) [Weightage 10 marks]
Evolutes and involutes; Evaluation of definite and improper integrals; Beta and Gamma functions and their properties; Applications of definite integrals to evaluate surface areas and volumes of revolutions.

UNIT 2: Calculus: (6 lectures, 2 tutorials) [Weightage 10 marks]
Rolle's Theorem, Mean value theorems, Taylor's and Maclaurin theorems with remainders; indeterminate forms and L'Hospital's rule; Maxima and Minima.

UNIT 3: Sequences and series: (10 lectures, 3 tutorials) [Weightage 18 marks]
Convergence of sequence and series, tests for convergence; Power series, Taylor's series, series for exponential, trigonometric and logarithm functions; Fourier series: Half range sine and cosine series, Parseval's theorem.

UNIT 4: Multivariable Calculus (Differentiation): (8 lectures, 3 tutorials) [Weightage 14 marks]
Limit, continuity and partial derivatives, directional derivatives, total derivative; Tangent plane and normal line; Maxima, minima and saddle points; Method of Lagrange multipliers; Gradient, Curl and Divergence.

UNIT 5: Matrices (10 lectures, 3 tutorials) [Weightage 18 marks]
Inverse and rank of a matrix, rank-nullity theorem; System of linear equations; Symmetric, skew-symmetric and orthogonal matrices; Determinants; Eigenvalues and eigenvectors; Diagonalization of matrices; Cayley-Hamilton Theorem, and Orthogonal transformation.

Suggested Text/Reference Books:

1. G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, 9th Edition, Pearson Education
2. Erwin Kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.
3. Veerarajan T., Engineering Mathematics for first year, Tata McGraw-Hill, New Delhi, 2008.
4. Ramana B.V., Higher Engineering Mathematics, Tata McGraw Hill New Delhi, 11th Reprint, 2010.
5. D. Poole, Linear Algebra: A Modern Introduction, 2nd Edition, Brooks/Cole, 2005.
6. R. K. Jain, S. R. K. Iyenger, Advanced Engineering Mathematics, Narosa Publications.
7. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 36th Edition, 2010.

Course Outcomes (COs)

CO1	The students will be able to apply differential and integral calculus to notions of curvature and to improper integrals. Apart from various applications, they will have a basic understanding of Beta and Gamma functions.
CO2	The students will be able to apply differential calculus to find TSE of functions, to find limits of Indeterminate form and to find maxima and minima of functions.
CO3	The students will be able to understand the concepts of sequence and series, and determine limits of sequences and convergence and approximate sums of series, and will be able to Find the Fourier series representation of a function of one variable.
CO4	The students will be able to understand the theory of multivariable differentiation and will be able to apply it to find maxima and minima, Gradient, Curl and Divergence of functions.
CO5	The students will be able to understand the essential tools of matrices including eigen values, eigen vectors and diagonalization.

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B.TECH. I/II SEMESTER						W.e.f. July, 2018	
COURSE CONTENTS							
CH 1301	**Chemistry**	**L**	**T**	**P**	**C**	**Max. Marks**	**Min. Marks**
Duration	3 Hours	3	1	2	5	70	22

Course Objective:
The course introduces students to the role of chemistry in their field as an engineer. The students are expected to learn the chemistry which is useful to enhance their skill & knowledge. The students can apply knowledge gained in dealing with various projects or issues related with their work.

Unit I
WATER ANALYSIS & TREATMENT:
Sources, Impurities, Hardness & its units, Softening of water by Lime -Soda method, Boiler troubles (Scale and sludge, Caustic embrittlement, Boiler corrosion, Priming & foaming), Internal treatments of boiler feed water, Water analysis (determination of alkalinity, temporary and permanent hardness by complexometry). Numerical problems based on above water softening process & water analysis. (10 lecture)

Unit II
PERIODIC PROPERTIES:
Effective nuclear charge, penetration of orbitals, variation of s,p,d and f orbital energies of atoms in the periodic table, electronic configurations, atomic and ionic sizes, ionization energies, electron affinity and electronegativity, polarisability, oxidation states, coordination number and geometries, hard soft acids and bases, molecular geometries. (8 lecture)

Unit III
LUBRICANTS & LUBRICATION:
Introduction, Mechanisms of lubrication, Classification of lubricants. Significance and determination of Viscosity & viscosity index, Flash and fire points, Cloud and pour points, Aniline point, Acid Number, Saponification Number, Steam Emulsion Number. (6 lecture)

Unit IV
POLYMERS & POLYMERISATION:
Monomers, Polymers, their classification, Thermo & Thermosetting Plastics with examples, Bio-Polymerization, Biodegradable Polymers, Preparation, Properties & Applications of PVC, PVA, Teflon, Nylon 6, Nylon 6:6, Polyester, Phenol-Formaldehyde, Urea- Formaldehyde, Natural & Synthetic Rubbers, Vulcanization of Rubber.(8 lecture)

Unit V
PHASE EQUILIBRIUM & CORROSION :
Phase diagram of single component (Water & CO_2), Phase diagram of binary Eutectic System(Pb-Ag), Corrosion: Types, Mechanisms & prevention.(8 lecture)

Course Outcome:
Students after completion of the course must possess understanding & knowledge of Chemistry which is significant for them and will earn respective credits for it.

Evaluation:
Evaluation will be continuous an integral part of the class as well as through external assessments.

Contd….2..

REFERENCES:

1. Chemistry in Engineering & Technology, Vol-I & Vol –II, J.C. Kuriacose & J. Rajaram, TMG, New Delhi
2. A Text Book of Engineering Chemistry - S. S. Dara & A.K. Singh, S. Chand Publications, New Delhi
3. Engineering chemistry - Jain and Jain, Dhanpat Rai publications, New Delhi
4. Engineering chemistry – Shashi Chawla , Dhanpat Rai publications, New Delhi
5. Engineering Chemistry, Subha Ramesh & Others, Wiley India Pvt. Ltd., New Delhi
6. Chemistry of Engineering Materials, C.V. Agrawal, C.P. Murthy & A. Naidu, B S Publications, Hyderabad
7. Engineering Chemistry- B.K.Sharma, Krishna Prakashan Media (P) Ltd, Meerut.
8. Advance Inorganic Chemistry Vol.1, Gurdeep Raj ; Goel Publishing House, Meerut (U.P.)
9. Engineering Chemistry : A Text Book, Harish K. Chopra & Anupama Parmar; Narosa Publishing House Pvt. Darya Ganj, New Delhi.
10. Essentials of Physical Chemistry, Arun Bahl, B.S. Bahl & G.D. Tuli; S. Chand & Co. Pvt. Ltd., Ram Nagar New Delhi.

Chemistry Practical

NOTE: About 10 of the following core experiments must be performed during the session.

1. **Water Testing**
   - (i) Determination of Total hardness of water by EDTA titration method.
   - (ii) Determination of alkalinity of water sample by titration.
   - (iii) Chloride estimation in water by Argentometric titration.

2. **Fuels & lubricant testing:**
   - (i) Flash & fire point determination by
     - a) Pensky's Martin Apparatus,
     - b) Abel's Apparatus,
     - c) Cleveland's open cup Apparatus.
   - (ii) Viscosity and Viscosity index determination by
     - a) Redwood viscometer No.1
     - b) Redwood viscometer No.2
   - (iii) Determination of Moisture content in fuel

3. Identification of functional groups of organic compounds/ Determination of melting/ boiling point of organic compounds.

4. **Measurement of kinetics of simple reactions.**

5. **Redox titrations:**
   Determination of percentage purity of Ferrous salt or percentage of Fe in an iron alloy by redox titration using N-Phenyl Anthranilic acid as an indicator.

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COURSE CONTENTS							
EE 1301	**Basic Electrical Engineering**	**L**	**T**	**P**	**C**	**Max. Marks**	**Min. Marks**
Duration	3 Hours	2	1	2	4	70	22

UNIT-I :
D.C. Circuits: Circuit reduction by series, parallel, star delta transformation, circuit analysis by mesh and nodal method, voltage and current source representation, dependent and independent sources, source conversion, superposition theorem, Thevenin's theorem.

UNIT-II :
A.C. Circuits: Generation of alternating voltages, RMS & average value, form and peak factors, phasor representation polar, rectangular and exponential form, circuit parameters, R-L, R-C and RLC series, parallel and series parallel circuits. Instantaneous and average power, active and reactive power, power factor, 3-phase balanced and unbalanced supply, star and delta connections.

UNIT-III :
Magnetic Circuits: Flux MMF and their relation, analogy between magnetic and electric circuits, saturation, B-H curves, fringing and leakage flux, AC excitation in magnetic circuits, induced voltage, hysteresis effect and eddy currents.

UNIT-IV :
Transformer - Single-phase transformer, basic concepts and constructional features, types of transformer, voltage, current and impedance transformation, equivalent circuits, phasor diagram, voltage regulation, losses and efficiency, OC and SC test. All day efficiency

UNIT-IV :
Rotating Electrical machines: Constructional features and working principle of DC machine, 3-Phase induction motor and synchronous machine.

References :

1. Vincent Del Toro - Electrical Engineering Fundamentals, PHI Learning
2.. Nagrath & Kothari - Basic Electrical Engineering, TMH.
3. Mittle & Mittal - Basic Electrical Engineering, III Edition TMH.
4. Cathey - Basic Electrical Engineering, Schaum Series, TMH.
5. Hughes - Electrical Technology, Pearson
6. Fitzarald & Batham – Basic Electrical Engineering.

List of Experiments :
1. Verification of KCL & KVL.
2. Study & measurement of power and power factor in R-L series circuit.
3. Study & measurement of power and power factor R-C series circuit.
4. Study & measurement of power and power factor R-L-C series circuit.
5. Study of Transformer.
6. Determination of equivalent circuit parameters by O.C. and S.C. test & estimation of voltage regulation & efficiency of transformer.
7. Measurement of various lines and phase quantities for a 3 phase circuit.

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COURSE CONTENTS							
ME 1301	**Engineering Graphics**	**L**	**T**	**P**	**C**	**Max. Marks**	**Min. Marks**
Duration	3 Hours	2	0	4	4	70	22

Unit I

Scales : Representative friction, plain scales, diagonal scale, scale of chord.

Conic Sections : Construction of ellipse, parabola and hyperbola by different methods, normal and tangent

Special Curves : Cycloidal, Involutes, Archimedean and logarithmic spirals.

Unit II

Projection: Types of projection, orthographic projection, first angle and third angle projection, projection of points and lines, true inclinations and true length of straight lines, traces of straight lines, projection on auxiliary planes.

Unit III

Projection of plains and solids: Projection of circle, triangle and polygons, projection of polyhedrons, pyramids in different positions.

Unit IV

Section of Solids: Section of right solids by normal and inclined planes.

Development of Surfaces: Parallel line and radial line method for right solids.

Unit V

Isometric Projections: Isometric scale, isometric axes, Isometric projection from orthographic projections.

Conversion of pictorial view into orthographic view of simple wall brackets, bearing blocks and simple blocks.

Reference Books:

1. Engineering Drawing by N.D. Bhatt. & V.M. Panchal; Charotar Publishing House Pvt. Ltd.
2. Engineering Drawing & Graphics by Basant Agrawal & C.M. Agrawal; McGraw Hill.
3. Engineering Graphics by D.A. Hindoliya; B.S. Publication.
6. Engineering Drawing by P.S. Gill; S.K. Kataria & Sons.
7. Machine Drawing by N.D. Bhatt; Charotar Publishing House Pv.
8. Engineering Drawing & Graphics by K. Venugopal; New Age International.

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B.TECH. I/II SEMESTER **W.e.f. July, 2018**

COURSE CONTENTS

EN 1301	English	L	T	P	C	Max. Marks	Min. Marks
Duration	3 Hours	4	0	0	4	70	22

Unit I

Languages and skills of communication: linguistic techniques, Modern usages, Reading comprehension, English phonetic symbols/ signs, Oral presentation, Audition Communication, Processes of communication, Verbal and Non Verbal Communication, Barriers to Communication.

Unit II

Application of linguistic ability: Writing of definitions of Engineering terms, Objects, Processes and Principles (Listening) Topics of General Interest, Reproduction from business, daily life, travel, health, buying and selling, company structure, systems etc.

Unit III

Letter Writing: Applications, Enquiry, Calling quotations, Tenders, Order and complaint.

Unit IV

Precise Writing, Noting and drafting, Technical Descriptions of simple engineering objects and processes (Writing), Report writing, Précis writing, note writing, slogan writing comment, speech advertising.

Unit V

Writing technical reports of the type of observation report, Survey report, Report of trouble, Laboratory Report and Project Report on the subjects of engineering. (Speaking) Vocabulary, Presentations, Demonstrations, Conversation - Telephone media, socializing, cultural events, debates, speech.

Reference Books and software's: -

1. Business Correspondence and Report Writing - By Sharma, TMH.
2. Living English Structure - By W. S. Allen, Longmans.
3. English Grammar- Ehrlich, Schaum Series, TMH
4. Spoken English for India - By R.K. Bansal and IB Harrison (Orient Longman).
5. New International Business English - By Joans and Alexander (OUP).
6. Effective Technical Communication- Rizvi, TMH
7. Globerina software for language laboratory

Language Laboratory:

The objective of the language lab is to expose students to a variety of listening and speaking drills. This would especially benefit students who are deficient in English and it also aims at confidence building for interviews and competitive examinations. The Lab is to cover following syllabus.

1. Communication lab.
2. Listening skills.
3. Speaking skills.
   (A) Phonetic symbols, pronunciation.
   (B). conversation: telephonic, face to face, formal and informal situations
4. Oral presentation.